

WHAT IS CLAIMED IS:

1. A light-emitting device comprising:

5 a compound semiconductor layer having a light-emitting layer portion, being configured so that one main surface of which serves as a light extraction surface;

a device substrate bonded on the other main surface side of the compound semiconductor layer;

10 and an Ag-base metal layer interposed between the device substrate and the compound semiconductor layer, including an Ag-base reflective metal layer having Ag as a major component over the entire portion thereof, and being intended for reflecting the light from the light-emitting layer portion back towards the light extraction surface side.

15

2. The light-emitting device as claimed in Claim 1, wherein the light-emitting layer portion has a peak emission wavelength within a range from 350 nm to 670 nm, both ends inclusive.

20 3. The light-emitting device as claimed in Claim 2, wherein the light-emitting layer portion is configured as having a double heterostructure in which a first-conductivity-type cladding layer, an active layer and a second-conductivity-type cladding layer, all of these layers being composed of $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ (where, $0 \leq x \leq 1$ and $0 \leq y \leq$
25 1) or $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{N}$ (where, $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x+y \leq 1$), are stacked

in this order.

4. The light-emitting device as claimed in Claim 1, further comprising a light-emitting-layer-portion-side, Ag-base contact layer having Ag as a major component, which is arranged in a discrete manner on the main surface of the Ag-base reflective metal layer, between the Ag-base reflective metal layer and the compound semiconductor layer.
5. The light-emitting device as claimed in Claim 4, wherein the light-emitting-layer-portion-side, Ag-base contact layer is an AgGeNi contact layer.
6. The light-emitting device as claimed in Claim 4, wherein the ratio of formation area of the light-emitting-layer-portion-side, Ag-base contact layer to the Ag-base reflective metal layer falls within a range from 1% to 25%, both ends inclusive.
7. The light-emitting device as claimed in Claim 4, wherein the Ag-base reflective metal layer has a ratio of Ag content which is set higher than that of the light-emitting-layer-portion-side, Ag-base contact layer.
8. The light-emitting device as claimed in Claim 1, wherein the Ag-base reflective metal layer has a ratio of Ag content of 95% by mass

or above.

9. The light-emitting device as claimed in Claim 8, wherein the Ag-base reflective metal layer is composed of pure Ag.

5

10. The light-emitting device as claimed in Claim 1, wherein the Ag-base reflective metal layer is composed of a Pd-containing Ag alloy.

11. The light-emitting device as claimed in Claim 1, wherein the
10 device substrate is a conductive semiconductor substrate, and the device further comprises a substrate-side, Ag-base contact layer which is formed between the device substrate and the Ag-base reflective metal layer, and has Ag as a major component.

12. The light-emitting device as claimed in Claim 11, wherein
15 the device substrate is a Si substrate.

13. The light-emitting device as claimed in Claim 11, wherein
the substrate-side, Ag-base contact layer is an AgSb contact layer or an
20 AgSn contact layer.

14. The light-emitting device as claimed in Claim 1, wherein the device substrate is a Si substrate having a sheet resistance of $0.01 \Omega/\square$.

25

15. A method of fabricating the light-emitting device as claimed in any one of Claims 1 to 14, comprising the steps of:

forming an Ag-base metal layer having Ag as a major component on at least either of the main surface of the compound semiconductor layer having a light-emitting layer portion, the main surface being opposite to that planned for becoming the light extraction surface, and the main surface of the device substrate, the main surface being planned to be disposed on the light-emitting-layer-portion side; and

forming a stack of the device substrate and the compound semiconductor layer while placing the Ag-base metal layer in between, and annealing the stack to thereby bond the device substrate with the compound semiconductor layer while placing the Ag-base metal layer in between.

16. The method of fabricating the light-emitting device as claimed in Claim 15, further comprising the steps of:

forming a first Ag-base metal layer, having Ag as a major component, on the bonding-side main surface of the compound semiconductor layer having the light-emitting layer portion, the bonding-side main surface being defined as the main surface opposite to that planned for becoming the light extraction surface;

forming a second Ag-base metal layer, having Ag as a major component, on the bonding-side main surface of the device substrate, the bonding-side main surface being defined as the main surface which is planned to be disposed on the light-emitting-layer-portion side; and

bonding the first Ag-base metal layer and the second Ag-base metal layer under a close contact through diffusion annealing, to thereby form the Ag-base reflective metal layer.

5 17. The method of fabricating the light-emitting device as claimed in Claim 16, wherein both of the first Ag-base metal layer and the second-Ag-base metal layer have a ratio of Ag content of 95% by mass or above, and the diffusion annealing is carried out at 100°C or higher.

10

 18. The method of fabricating the light-emitting device as claimed in Claim 16, wherein the compound semiconductor layer is formed using $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ (where, $0 \leq x \leq 1$ and $0 \leq y \leq 1$), further comprises a step of forming an AgGeNi contact layer on the
15 bonding-side main surface of the compound semiconductor layer, the first Ag-base metal layer is formed so as to cover the AgGeNi contact layer, and further comprises a step of annealing the AgGeNi contact layer and the compound semiconductor layer for alloying.

20 19. The method of fabricating the light-emitting device as claimed in Claim 16, wherein the device substrate comprises a Si substrate, further comprises a step of forming an AgSb contact layer on the bonding-side main surface of the Si substrate, the second Ag-base metal layer is formed so as to cover the AgSb contact layer, and further
25 comprises a step of annealing the AgSb contact layer and the Si

substrate for alloying.

20. The method of fabricating the light-emitting device as claimed in Claim 16, wherein both of the first Ag-base metal layer and
5 the second-Ag-base metal layer have a ratio of Ag content of 95% by mass or above, and the diffusion annealing is carried out at 100°C or higher and lower than 840°C.

21. A light-emitting device comprising:

10 a light-emitting layer portion being composed of a first compound semiconductor, having an emission peak wavelength of 450 to 580 nm, and having a light extraction surface on the main surface side thereof;

an Ag-base contact layer formed on the main back surface of the light-emitting layer portion, or formed on the main back surface of an
15 auxiliary compound semiconductor layer composed of a second compound semiconductor, which is transparent with respect to emission light flux and is electrically coupled to the main back surface of the light-emitting layer portion, the Ag-base contact layer comprising an alloyed layer originated from an Ag-base contact metal, having Ag as a
20 major component, and the compound semiconductor composing the main back surface of the compound semiconductor layer; and

an Ag-base reflective metal layer, composed of a metal having Ag as a major component, for reflecting light from the light-emitting layer portion back towards the light extraction surface side, and being formed
25 so as to cover the Ag-base contact layer.

22. The light-emitting device as claimed in Claim 21, wherein the light-emitting layer portion is configured as having a double heterostructure in which a first-conductivity-type cladding layer, an active layer and a second-conductivity-type cladding layer, all of these layers being composed of $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ (where, $0 \leq x \leq 1$ and $0 \leq y \leq 1$) or $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{N}$ (where, $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x+y \leq 1$), are stacked in this order.

23. The light-emitting device as claimed in Claim 21, wherein the auxiliary compound semiconductor layer is a transparent conductive substrate bonded to a compound semiconductor layer composing the light-emitting layer portion, and the Ag-base reflective metal layer reflects light from the light-emitting layer portion back towards the light extraction surface side through the transparent conductive substrate.

24. The light-emitting device as claimed in Claim 23, wherein the Ag-base contact layer is arranged in a discrete manner on the main surface of the Ag-base reflective metal layer, between the Ag-base reflective metal layer and the transparent conductive substrate.

25. The light-emitting device as claimed in Claim 24, wherein the Ag-base contact layer is formed in a ratio of formation area of 1% to 25%, both ends inclusive, with respect to the Ag-base reflective metal layer.

26. The light-emitting device as claimed in Claim 21, wherein the Ag-base reflective metal layer has a ratio of Ag content larger than that of the Ag-base contact layer.

5

27. The light-emitting device as claimed in Claim 21, wherein the Ag-base reflective metal layer has a ratio of Ag content of 95% by mass or above.

10

28. The light-emitting device as claimed in Claim 27, wherein the Ag-base reflective metal layer is composed of pure Ag.

15

29. The light-emitting device as claimed in Claim 21, wherein the Ag-base reflective metal layer is composed of a Pd-containing Ag alloy.

30. An ohmic electrode structure for a semiconductor device comprising;

20 an Ag-base contact layer formed on the surface of a device main body composed of a Group III-V compound semiconductor, and comprising an alloyed layer originated from an AgGeNi contact metal having Ag as a major component and including also Ni and Ge, and the Group III-V compound semiconductor; and

25 an electrode layer formed so as to cover the Ag-base contact layer, and being composed of an Ag-base metal having Ag as a major

component.

31. A light-emitting device comprising:

5 a compound semiconductor layer having a light-emitting layer portion, being configured so that a first main surface of which serves as a light extraction surface; and

a device substrate bonded on a second main surface side of the compound semiconductor layer while placing a main metal layer in between, the main metal layer having a reflective surface for reflecting
10 light from the light-emitting layer portion back towards the light extraction surface side; further comprising:

a diffusion-blocking layer interposed between the device substrate and the main metal layer, being composed of a conductive material, and provided for blocking diffusion of any
15 device-substrate-derived components towards the main metal layer.

32. The light-emitting device as claimed in Claim 31, further comprising a substrate-side contact metal layer interposed between the diffusion-blocking layer and the device substrate, intended for reducing
20 contact resistance between the device substrate and the diffusion-blocking layer.

33. The light-emitting device as claimed in Claim 31, wherein the main metal layer is composed of an Au-base layer having Au as a
25 major component, at least in a portion including the interface with the

diffusion-blocking layer, and the device substrate is a Si substrate.

34. The light-emitting device as claimed in Claim 33, wherein the diffusion-blocking layer is a metal layer for blocking diffusion, having
5 either Ti or Ni as a major component.

35. The light-emitting device as claimed in Claim 34, wherein the metal layer for blocking diffusion has a thickness of 1 nm to 10 μm , both ends inclusive.
10

36. The light-emitting device as claimed in Claim 33, wherein the device substrate is an n-type Si substrate, and further comprises a substrate-side contact metal layer interposed between the diffusion-blocking layer and the Si substrate, being composed of an
15 AuSb alloy or an AuSn alloy, and being intended for reducing contact resistance between the Si substrate and the diffusion-blocking layer.

37. The light-emitting device as claimed in Claim 33, wherein the Au-base layer composes the reflective layer.
20

38. The light-emitting device as claimed in Claim 33, wherein the Ag-base layer interposed between the Au-base layer and the compound semiconductor layer, and having Ag as a major component, composes the reflective layer.
25

39. A method of fabricating a light-emitting device, the device comprising:

a compound semiconductor layer having a light-emitting layer portion, being configured so that a first main surface of which serves as
5 a light extraction surface; and

a device substrate bonded on a second main surface side of the compound semiconductor layer while placing a main metal layer in between, the main metal layer having a reflective surface for reflecting light from the light-emitting layer portion back towards the light
10 extraction surface side;

the method comprising the steps of:

forming a diffusion-blocking layer on the main surface of the device substrate on the side the compound semiconductor layer is to be bonded, being composed of a conductive material and planned for
15 blocking diffusion of any device-substrate-derived components towards the main metal layer;

forming the main metal layer on at least either one of the second main surface of the compound semiconductor layer, and the main surface of the diffusion-blocking layer formed on the device substrate;
20 and

bonding the device substrate and the compound semiconductor layer while placing the diffusion-blocking layer and the main metal layer in between.

25 40. The method of fabricating a light-emitting device as claimed

in Claim 39, wherein the device substrate and the compound semiconductor layer are bonded by stacking the device substrate and the compound semiconductor layer while placing the diffusion-blocking layer and the main metal layer in between, and then annealing the stack.

5

41. The method of fabricating a light-emitting device as claimed in Claim 39, further comprising a step of forming a substrate-side contact metal layer on the main surface of the device substrate, intended for reducing contact resistance between the device substrate and the diffusion-blocking layer, and the diffusion-blocking layer is formed on the substrate-side contact metal layer.

42. The method of fabricating a light-emitting device as claimed in Claim 39, wherein the main metal layer is composed of an Au-base layer having Au as a major component, at least in a portion including the interface with the diffusion-blocking layer, and the device substrate is a Si substrate.

43. The method of fabricating a light-emitting device as claimed in Claim 42, wherein the diffusion-blocking layer is a metal layer for blocking diffusion, having either Ti or Ni as a major component.

44. The method of fabricating a light-emitting device as claimed in Claim 43, wherein the metal layer for blocking diffusion has a thickness of 1 nm to 10 μm , both ends inclusive.

25

45. The method of fabricating a light-emitting device as claimed in Claim 42, wherein the device substrate is an n-type Si substrate, and further comprises a substrate-side contact metal layer interposed
5 between the diffusion-blocking layer and the Si substrate, being composed of an AuSb alloy or an AuSn alloy, and being intended for reducing contact resistance between the Si substrate and the diffusion-blocking layer.

10 46. The method of fabricating a light-emitting device as claimed in Claim 39, further comprising the steps of:

disposing a first Au-base layer planned for becoming the main metal layer and having Au as a major component, on the bonding-side main surface of the compound semiconductor layer, the bonding-side
15 main surface being defined as the main surface opposite to that planned for becoming the light extraction surface;

disposing a second Au-base layer planned for becoming the main metal layer and having Au as a major component, on a bonding-side main surface of the device substrate, the bonding-side
20 main surface being defined as the main surface planned to be disposed on the light-emitting-layer-portion side; and

bonding the first Au-base layer and the second Au-base layer under close contact.

25 47. The method of fabricating a light-emitting device as claimed

in Claim 46, wherein the device substrate is a Si substrate.

48. The method of fabricating a light-emitting device as claimed
in Claim 46, wherein the reflective surface is composed of the first
5 Au-base layer.

49. A light-emitting device comprising:
a compound semiconductor layer having a light-emitting layer
portion, being configured so that one main surface of which serves as a
10 light extraction surface;
a device substrate bonded on the other main surface side of the
light-emitting layer portion;
and a reflective metal layer interposed between the device
substrate and the light-emitting layer portion, having any one of Ag, Ru,
15 Rh, Re, Os, Ir and Pt as a major component, and being intended for
reflecting the light from the light-emitting layer portion back towards the
light extraction surface side.

50. The light-emitting device as claimed in Claim 49, wherein
20 the light-emitting layer portion has a peak emission wavelength of 670
nm or shorter.

51. The light-emitting device as claimed in Claim 49, wherein
the reflective metal layer is an Ag-base reflective metal layer having Ag
25 as a major component.

52. The light-emitting device as claimed in Claim 51, wherein the light-emitting layer portion has a peak emission wavelength within a range from 350 nm to 670 nm, both ends inclusive.

5

53. The light-emitting device as claimed in Claim 52, wherein the light-emitting layer portion has a peak emission wavelength within a range from 450 nm to 580 nm, both ends inclusive.

10 54. The light-emitting device as claimed in Claim 53, wherein the light-emitting layer portion is configured as having a double heterostructure in which a first-conductivity-type cladding layer, an active layer and a second-conductivity-type cladding layer, all of these layers being composed of $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ (where, $0 \leq x \leq 1$ and $0 \leq y \leq$
15 1) or $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{N}$ (where, $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x+y \leq 1$), are stacked in this order.

55. The light-emitting device as claimed in Claim 51, wherein the Ag-base reflective metal layer is bonded to the light-emitting layer
20 portion while placing an AuGeNi contact layer in between.

56. The light-emitting device as claimed in Claim 55, wherein the AuGeNi contact layer is formed on the main surface of the Ag-base reflective metal layer in a discrete manner.

25

57. The light-emitting device as claimed in Claim 56, wherein the AuGeNi contact layer is formed in a ratio of formation area of 1% to 25%, both ends inclusive, with respect to the Ag-base reflective metal layer.

5

58. The light-emitting device as claimed in Claim 51, wherein the Ag-base reflective metal layer is bonded to the light-emitting layer portion while placing an Ag-base contact layer having Ag as a major component in between.

10

59. The light-emitting device as claimed in Claim 58, wherein the Ag-base contact layer is formed on the main surface of the Ag-base reflective metal layer in a discrete manner.

15

60. The light-emitting device as claimed in Claim 59, wherein the Ag-base contact layer is formed in a ratio of formation area of 1% to 25%, both ends inclusive, with respect to the Ag-base reflective metal layer.

20

61. The light-emitting device as claimed in Claim 58, wherein the Ag-base reflective metal layer has a ratio of Ag content which is set higher than that of the Ag-base contact layer.

62. The light-emitting device as claimed in Claim 55, wherein
25 the Ag-base contact layer is composed of an AgGeNi alloy having Ag as

a major component and including also Ni and Ge.

63. The light-emitting device as claimed in Claim 51, wherein the Ag-base reflective metal layer is bonded to the light-emitting layer
5 portion while placing a protective metal layer in contact with the Ag-base reflective metal layer in between.

64. The light-emitting device as claimed in Claim 63, wherein the protective metal layer is an Au-base metal layer having Au as a
10 major component.

65. The light-emitting device as claimed in Claim 63, wherein the protective metal layer has a thickness of 0.5 nm to 15 nm, both ends inclusive.
15

66. The light-emitting device as claimed in Claim 49, wherein the reflective metal layer is bonded to the device substrate while placing a binding-use metal layer in between.

20 67. The light-emitting device as claimed in Claim 66, wherein the binding-use metal layer is an Au-base metal layer having Au as a major component.

68. The light-emitting device as claimed in Claim 67, wherein
25 the reflective metal layer is bound to the device substrate while placing

the binding-use metal layer which is composed of a first Au-base layer and a second Au-base layer disposed in contact with each other in this order as viewed from the reflective metal layer side.

5 69. A method of fabricating the light-emitting device as claimed in Claim 68, comprising the steps of:

forming the reflective metal layer on a bonding-side main surface of the compound semiconductor layer, the bonding-side main surface being defined as the main surface opposite to that planned for becoming
10 the light extraction surface;

disposing a first Au-base layer having Au as a major component and being a precursor for the binding-use metal layer;

disposing a second Au-base layer, having Au as a major component, on the bonding-side main surface of the device substrate,
15 the bonding-side main surface being defined as the main surface which is planned to be disposed on the light-emitting-layer-portion side; and

bonding the first Au-base layer and the second Au-base layer under a close contact.

20 70. A method of fabricating a light-emitting device, the device comprising:

a compound semiconductor layer having a light-emitting layer portion, being configured so that one main surface of which serves as a light extraction surface; and

25 a device substrate bonded on the other main surface side of the

compound semiconductor layer while placing a metal layer in between, the metal layer having a reflective surface for reflecting light from the light-emitting layer portion back towards the light extraction surface side, and the metal layer being composed of an Au-base layer having Au as a major component at least in a portion thereof including the reflective surface;

the method comprising the steps of:

disposing a first Au-base layer on a bonding-side main surface of the compound semiconductor layer, the bonding-side main surface being defined as the main surface opposite to that planned for becoming the light extraction surface;

disposing a second Au-base layer on the bonding-side main surface of the device substrate, the bonding-side main surface being defined as the main surface which is planned to be disposed on the light-emitting-layer-portion side; and

bonding the first Au-base metal layer and the second Au-base metal layer under a close contact.

71. The method of fabricating a light-emitting device as claimed in Claim 70, wherein the light-emitting layer portion is configured to emit light having a peak emission wavelength of 550 nm or longer.

72. The method of fabricating a light-emitting device as claimed in Claim 70, wherein:

the light-emitting layer portion is first formed by epitaxial growth

on a light-emitting-layer-growing substrate composed of a compound semiconductor;

the first Au-base layer is formed on the bonding-side main surface of the light-emitting layer portion in a state of being united with
5 the light-emitting-layer-growing substrate;

the second Au-base layer is formed on the bonding-side main surface of the device substrate;

the first Au-base layer and the second Au-base layer are bonded under a close contact; and

10 after the bonding, the light-emitting-layer-growing substrate is separated from the light-emitting layer portion by chemical etching.

73. The method of fabricating a light-emitting device as claimed in Claim 72, wherein the light-emitting layer portion is composed of
15 $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ (where, $0 \leq x \leq 1$ and $0 \leq y \leq 1$), the light-emitting-layer-growing substrate is composed of a GaAs substrate, and

the chemical etching is carried out using an ammonia/hydrogen peroxide mixed solution so as to dissolve the GaAs substrate.

20

74. The method of fabricating a light-emitting device as claimed in Claim 72, wherein the light-emitting layer portion composed of $(\text{Al}_x\text{Ga}_{1-x})_y\text{In}_{1-y}\text{P}$ (where, $0 \leq x \leq 1$ and $0 \leq y \leq 1$) is formed on a GaAs substrate which serves as the light-emitting-layer-growing substrate
25 while placing an AlAs releasing layer in between, and

the chemical etching is carried out using a hydrofluoric acid-containing solution so as to dissolve the AlAs releasing layer.

75. The method of fabricating a light-emitting device as claimed
5 in Claim 70, wherein:

the light-emitting layer portion is composed of a Group III-V compound semiconductor;

both of the first Au-base layer and the second Au-base layer are composed of an Au-base metal having a ratio of Au content of 95% by
10 mass or above, and

the first Au-base layer and the second Au-base layer are bonded by subjecting them under a close contact to annealing for bonding at a temperature higher than 180°C and not higher than 360°C.

15 76. The method of fabricating a light-emitting device as claimed in Claim 75, wherein the annealing for bonding is carried out at a temperature lower than 300°C.

77. The method of fabricating a light-emitting device as claimed
20 in Claim 75, wherein the Group III element in the compound semiconductor layer is composed of at least any one selected from Al, Ga and In, and the Group V element in the same layer is composed of at least either one of P and As.

25 78. The method of fabricating a light-emitting device as claimed

in Claim 70, wherein the device substrate is configured by using a Si substrate.

79. The method of fabricating a light-emitting device as claimed
5 in Claim 70, further comprising a step of forming a substrate-side
contact layer on the bonding-side main surface of the device substrate
composed of a Si substrate, the second Au-based layer is formed so as
to cover the substrate-side contact layer, and further comprising a step
of annealing the substrate-side contact layer and the Si substrate for
10 alloying.

80. The method of fabricating a light-emitting device as claimed
in Claim 70, further comprising a step of forming a
light-emitting-layer-portion-side contact layer having Au as a major
15 component, in a discrete manner on the main surface of the first
Au-base layer, between the first Au-base layer and the compound
semiconductor layer.

81. A light-emitting device comprising:
20 a compound semiconductor layer having a light-emitting layer
portion, being configured so that a first main surface of which serves as
a light extraction surface;

a Si substrate bonded on a second main surface side of the
compound semiconductor layer while placing a metal layer in between;
25 wherein the bonding surface of the metal layer with the

compound semiconductor layer forms a reflective layer, and the metal layer has a Si-diffusion-blocking layer having Au or Ag as a major component and also containing a Si-diffusion-blocking component which comprises a single, or two or more elements selected from Sn, Pb, In and Ga, and being planned for inhibiting Si diffused from the Si substrate from depositing on the reflective surface.

82. The light-emitting device as claimed in Claim 81, wherein the Si-diffusion-blocking layer has a content of the Si-diffusion-blocking component of 1% by mass to 20% by mass, both ends inclusive.

83. The light-emitting device as claimed in Claim 81, further comprising a substrate-side contact alloyed layer interposed between the Si-diffusion-blocking layer and the Si substrate, and being intended for reducing contact resistance between the Si substrate and the Si-diffusion-blocking layer.

84. The light-emitting device as claimed in Claim 81, wherein the metal layer has a main metal layer between the compound semiconductor layer and the Si-diffusion-blocking layer, the main metal layer having a content of the Si-diffusion-blocking component smaller than that of the Si-diffusion-blocking layer.

85. The light-emitting device as claimed in Claim 84, wherein the Si-diffusion blocking layer has a thickness of 50 nm or above and 5

μm or less.

86. The light-emitting device as claimed in Claim 84, wherein
the Si-diffusion-blocking layer has Au as a major component; and
5 the main metal layer comprises an Au-base main metal layer
which forms the reflective surface and has Au as a major component.

87. The light-emitting device as claimed in Claim 84, wherein
the Si-diffusion-blocking layer has Au as a major component; and
10 the main metal layer is composed of an Au-base coupling layer
having Au as a major component, in a portion thereof in contact with the
Si-diffusion-blocking layer, and is composed of an Ag-base reflective
layer having Ag as a major component or an Al-base reflective layer
having Al as a major component, in a portion thereof composing the
15 reflective surface.

88. The light-emitting device as claimed in Claim 81, wherein
the reflective surface is configured by the Si-diffusion-blocking layer.

20 89. A method of fabricating the light emitting device, the device
comprising:

a compound semiconductor layer having a light-emitting layer
portion, being configured so that a first main surface of which serves as
a light extraction surface; and

25 a Si substrate bonded on a second main surface side of the

compound semiconductor layer while placing a metal layer in between, wherein the bonding surface between the metal layer and the compound semiconductor layer configures a reflective layer;

the method comprising the steps of:

- 5 forming the metal layer as having a Si-diffusion-blocking layer which has Au or Ag as a major component and also contains a Si-diffusion-blocking component which comprises a single, or two or more elements selected from Sn, Pb, In and Ga, and being planned for inhibiting Si diffused from the Si substrate from depositing on the
10 reflective surface; and

 bonding the Si substrate and the compound semiconductor layer while placing the metal layer in between.

90. The method of fabricating the light emitting device as
15 claimed in Claim 89, wherein the Si substrate and the compound semiconductor layer are bonded by stacking the Si substrate and the compound semiconductor layer while placing the metal layer in between, and then annealing the stack.